higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

T1200**(E)**(J22)T

AUGUST EXAMINATION

NATIONAL CERTIFICATE

PLATERS' THEORY N2

(11022182)

22 July 2014 (Y-Paper)
13:00–16:00

Nonprogrammable calculators may be used.

This question paper consists of 6 pages and 3 diagram sheets.

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DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE
PLATERS' THEORY N2
TIME: 3 HOURS
MARKS: 100

INSTRUCTIONS AND INFORMATION

1. Answer ALL the questions.
2. Read ALL the questions carefully.
3. Number the answers according to the numbering system used in this question paper.
4. Full marks = 100%.
5. Freehand drawings MUST be done neatly, in PENCIL, and be reasonably large.
6. Write neatly and legibly.

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QUESTION 1: MACHINES

1.1 State THREE safety precautions to be taken when working with the bending rolls. (3)

1.2 Explain the working principle of the plate bending rolls. (3)

1.3 FIGURE 1, DIAGRAM SHEET 1 shows a drawing of a box and pan-folding machine.

List the names of the labelled parts A, B, C, and D in your ANSWER BOOK. (4)
[10]

QUESTION 2: ROLLING AND BENDING

2.1 Explain how the vertical rolls bend a plate. Make use of freehand drawings to give detail to the explanation. (4)

2.2 FIGURE 2, DIAGRAM SHEET 1 shows the top view of an angle-iron frame.

2.2.1 Calculate the length of the angle-iron required to manufacture the frame. (4)

2.3 FIGURE 3, DIAGRAM SHEET 2, shows a sketch of a bent steel profile.

2.3.1 Illustrate with the aid of a sketch the position and direction of the heating triangles which can be used to straighten the steel profile. (2)
[10]

QUESTION 3: JOINING OF STEEL SECTIONS

3.1 Explain the purpose of 'an assembly jig.' (3)

3.2 Illustrate by means of a freehand drawing the preparation of the ends of TWO equal angle-iron bars that have to be welded to one another at 90°. (2)

3.3 In most workshops, devices of a simple nature are often made from scrap metal. FIGURE 4, DIAGRAM SHEET 2, shows a vertical plate that must be pulled down onto the horizontal plate to be welded.

3.3.1 With the aid of a freehand drawing explain how the device for pulling down the vertical plate onto the horizontal plate can be performed. (5)
[10]

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QUESTION 4: GENERAL PIPEWORK

4.1 FIGURE 5, DIAGRAM SHEET 2, shown a drawing of a pipe contour marker.

List the names of the labelled parts (A to F) in your ANSWER BOOK. (6)

4.2 When referring to pipe flanges, describe with the aid of a freehand drawing, what is meant by the term, “Two holes top”? (2)
[8]

QUESTION 5: STEEL STRUCTURES

5.1 A roof truss has a span of 16 m of which the rafter is 8 944 m. Calculate the following with respect to the truss:

5.1.1 .Rise. (2)

5.1.2 Pitch (2)

5.2 FIGURE 6 DIAGRAM SHEET 3, shows a part of a roof truss.

Write the names of the labelled parts in the drawing, next to the letters (A–B) in the ANSWER BOOK. (2)
[6]

QUESTION 6: TEMPLATES

Make neat freehand drawings of the following types of templates:

6.1 Flange template

6.2 Web template

6.3 Box template

(3 x 2) **[6]**

QUESTION 7: METALS

7.1 Explain the meaning of the term *non-ferrous metal*. (1)

7.2 Choose the correct word from the list below. Write only the word next to the question number in your ANSWERE BOOK.

The process used to reduce the brittleness of a hardened chisel point, is known as:-

annealing; tempering; normalising	(1)

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7.3 Different properties of steel are obtained by alloying a metal with certain elements.

Write the correct name of the alloying element that will give the desired properties next to the question numbers (7.3.1–7.3.3), one below the other, in the ANSWER BOOK.

7.3.1 Improves hardness, wear resistance, corrosion resistance and magnetic properties. (2)

7.3.2 Improves hardness, wear resistance, corrosion resistance and magnetic properties. (2)

7.3.3 Refines and gives grain structure, high-bending resistance, wear and fatigue resistance. (2)
[8]

QUESTION 8: GAS WELDING, CUTTING AND PLASMA CUTTING

8.1 Name FOUR factors that influence the quality of an oxy-acetylene gas weld joint. (4)

8.2 State the use of flame-cleaning nozzles. (3)

8.3 Explain the effect on the quality of a gas cut surface if the nozzle is too high from the surface which is being cut. (2)

8.4 State the function of flame-cutting nozzles. (3)
[12]

QUESTION 9: ARC WELDING

9.1 Name TWO causes of each of the following welding defects:

9.1.1 Undercutting (2)

9.1.2 Poor penetration (2)

9.2 Draw the international welding symbols as used by the SABS code of practice for welding of the following welding joints.

9.2.1 Single V-butt joint (2)

9.2.2 Single bevel butt joint (2)

9.2.3 Single U-butt joint (2)

9.2.4 Single J-butt joint (2)

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9.2.5 Single V-butt joint (2)

9.2.6 Square-butt joint (1)

[15]

QUESTION 10: CALCULATIONS AND PLANNING

10.1 Determine the mass of the 5 mm plate required to form a cone with the following measurements:

Base diameter (D) = 600 mm
Top diameter (d) = 300 mm
Slant length (S) = 500 mm

Given: 1 mm plate: = 7,85 kg/m²
Area of plate: = 0,5 x π x S x (D + d) (5)

10.2 FIGURE 7, DIAGRAM SHEET 3, shown a roof truss which is mounted on vertical pillars.

Copy the material list below in you ANSWER BOOK and then complete the table by determining the total mass of the roof truss.

MARK	QUANTITY	MATERIAL	LENGTH	Kg/m	MASS
A		70 X 70X 6L	1,372m	6,38	
B		70 X 70 X 6L	3,0m	6,38	
C		50 X 50 X 6L	0,83m	4,47	
D		60 X 60 X 6L	0,1m	5,42	
E		50 X 100L	0,13m	11,00	
TOTAL:					

(10)

[15]

TOTAL: 100

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DIAGRAM SHEET 1

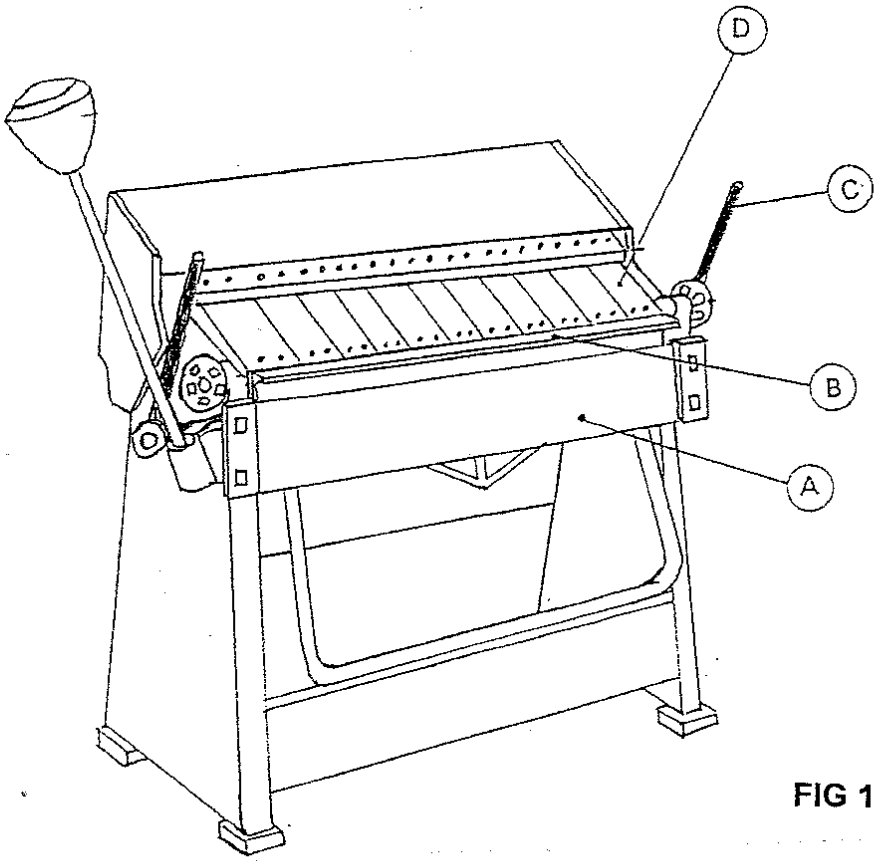

FIG 1

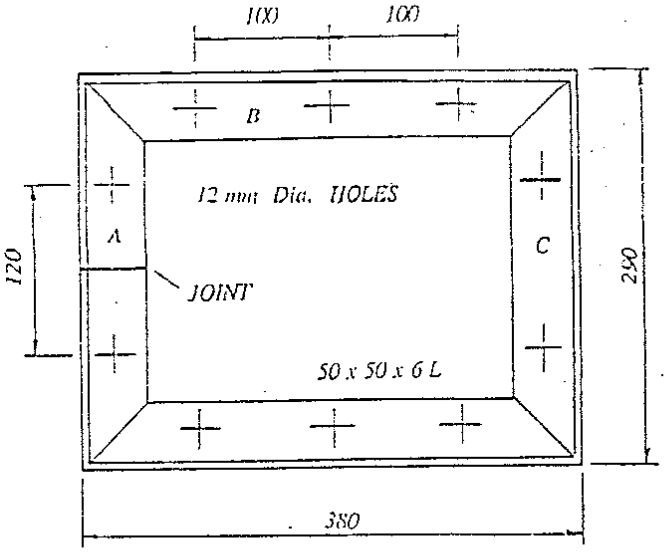

FIG 2

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DIAGRAM SHEET 2

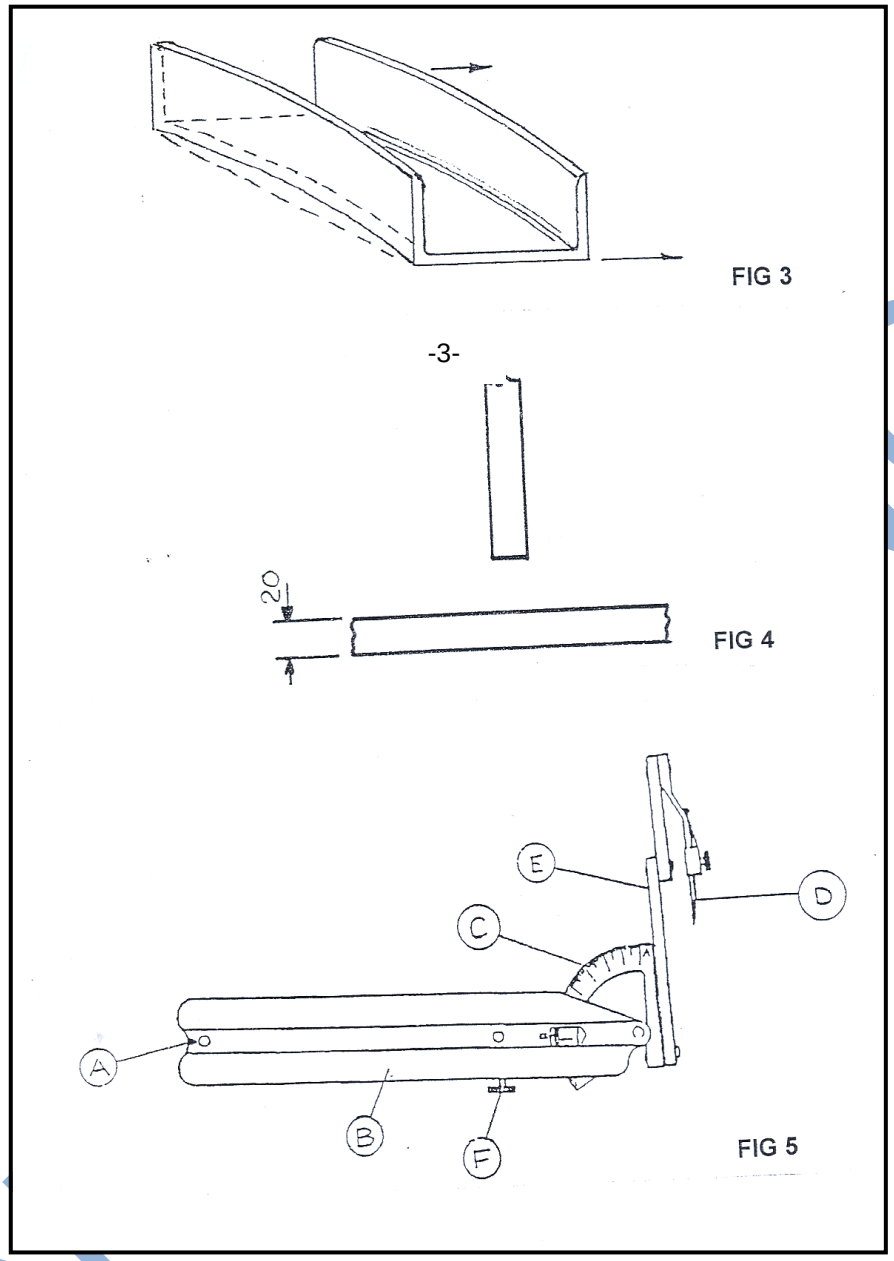

FIG 3

-3-

FIG 4

FIG 5

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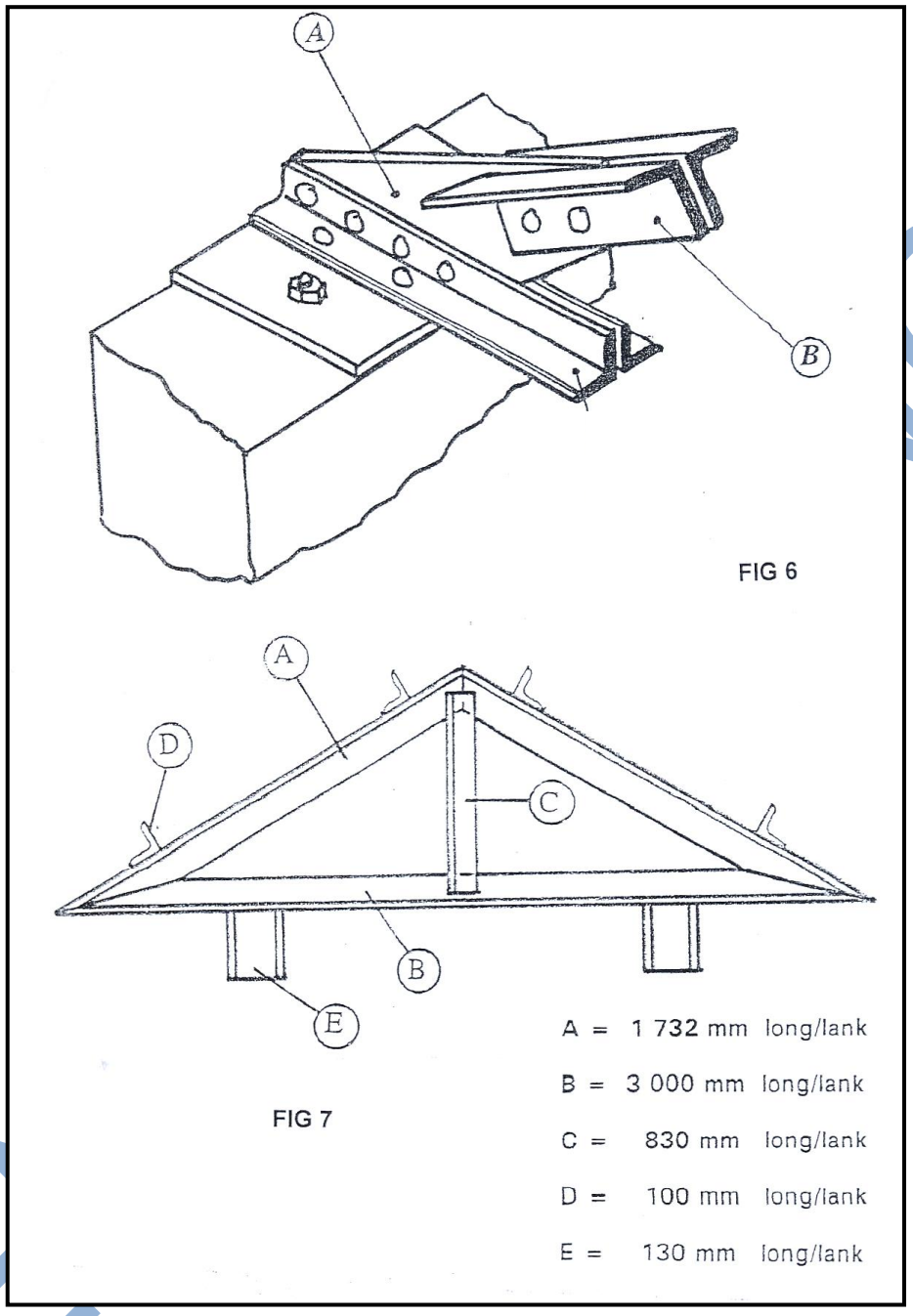
DIAGRAM SHEET 3



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